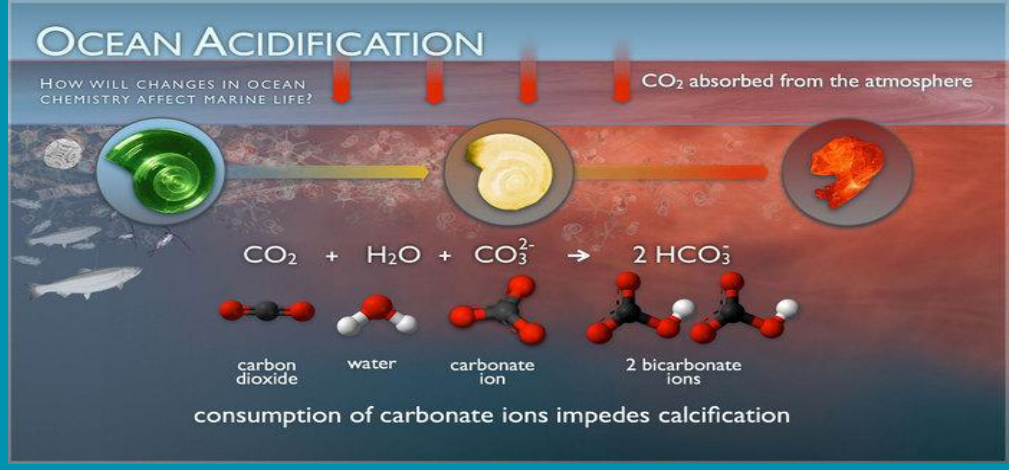
West Coast Sanctuaries

Ocean Acidification Action Plan

By: Ed Bowlby

NATIONAL MARINE SANCTUARIES OF THE WEST COAST OCEAN ACIDIFICATION ACTION PLAN



- CINMS adopted OA Report in September 2008.
- OCNMS SAC adopted OA resolution in Apr 2009
- By January 2010, all 13 sanctuaries had adopted similar resolutions.
- OA Action Plan was developed in response to resolutions passed by all five West Coast SACs.
- Coordinated approach to addressing ocean acidification issues.

WEST COAST OCEAN ACIDIFICATION TASK FORCE

- West Coast Regional Office
- Olympic Coast NMS
- Cordell Bank NMS
- Gulf of the Farallones NMS
- Monterey Bay NMS
- Channel Islands NMS
- Channel Islands NMS SAC
- Pacific Marine Environmental laboratory
- National Centers for Coastal Ocean Science

COMPREHENSIVE STRATEGY ON OCEAN ACIDIFICATION

- Understand and protect biological communities within West Coast Sanctuaries
- Develop adaptations
- Communicate these impacts and solutions to the public

SEVEN STRATEGIES

1. Monitoring for ocean acidification
2. Research on ocean acidification
3. Education and outreach
4. Mitigating damages to sanctuary resources
5. Influencing national policy
6. Demonstrate leadership by reducing carbon emissions
7. Internal coordination on ocean acidification issues.

MONITORING - ACTIVITIES

1.1 Inventory existing monitoring activities including oceanographic moorings and at-sea surveys

1.2 Identify appropriate types of measurements and develop a sampling plan to track changes in ocean chemistry (including dissolved oxygen and temperature)

1.3 Consider modifying moorings and/or surveys to collect additional samples

1.4 Maximize partnerships and data sharing

RESEARCH - ACTIVITIES

2.1 Identify indicator species for different Sanctuary habitats in the 5 West Coast Sanctuaries

2.2 Encourage research within Sanctuaries

2.3 Identify and research ocean acidification impact mitigation measures for populations of species that become weakened or reduced by changing pH

EDUCATION AND OUTREACH - ACTIVITIES

3.1 Inventory, share and track OA education programs, resources and materials

3.2 Assess audience needs and evaluate existing programs for success

3.3 Develop tools and resources to fill gaps

MITIGATING DAMAGES TO SANCTUARY RESOURCES - ACTIVITIES

4.1 Review existing habitat characterization efforts to identify areas of priority habitat

4.2 Identify Sanctuary habitats that are most effective in sequestering carbon

4.3 Evaluate internal Sanctuary projects for high levels of carbon emissions; consider methods for reducing emissions

MITIGATING DAMAGES TO SANCTUARY RESOURCES - ACTIVITIES

4.4 In reviewing permit applications, consider effects on habitats that serve as carbon reservoirs; include measures to reduce effects

4.5 Reduce impacts of additional stressors on habitats

4.6 Pursue partnerships to protect and restore priority and carbon reservoir habitats; outreach to ocean users and coastal industries

INFLUENCING NATIONAL POLICY - ACTIVITIES

Use outcomes from Strategies 1 – 4 to:

1. Determine thresholds for key indicator species
2. Determine the resiliency of ecosystems to multiple stressors
3. Identify mitigation and adaptation strategies
4. Share findings and risk analyses with broader national stakeholders and partners

DEMONSTRATING LEADERSHIP BY REDUCING CARBON EMISSIONS - ACTIVITIES

6.1 Inventory GHG emissions from Sanctuary operations

6.2 Implement best practices for facilities, operations

6.3 Encourage reductions in carbon emissions by Sanctuary users

INTERNAL COORDINATION ACTIVITIES

7.1 Develop a mechanism to share and coordinate information amongst the West Coast Sanctuaries

Create a standing Ocean Acidification Action Team

OA in Draft Management Plan

Strategy OCEO3: OCEAN ACIDIFICATION

Investigate changing ocean chemistry, acoustics and other physio-chemical changes and impacts to living organisms associated with increasing carbon dioxide levels in the atmosphere.

Activity A: Collaborate in regional efforts to monitor and model carbonate system variables to improve understanding of the extent and severity of ocean acidification.

Activity B: Collaborate in research on the effects of ocean acidification on calcifying and non-calcifying organisms, including deep sea corals, plankton, intertidal invertebrates, and on trophic relationships between these organisms.

Strategies in WCR OA Action Plan

1. Monitoring: Monitor changing conditions in the ocean.
2. Research: Collect and prioritize research to understand the effects.
3. Education: Develop & increase awareness of ocean acidification.
4. Sustainability: Increase ecosystem resilience to mitigate damages to sanctuary resources.
5. National Policy: Work with partners to provide information that will influence national policy.
6. Environment: Reduce carbon emissions/footprint.
7. Coordination: Coordinate and share information amongst west coast sanctuaries.

OCNMS DMP

B2. Phys. & Chem. Oceanography Action Plan

D2. Climate Change Action Plan

OCEO3 – Ocean Acidification

CLIM2 - Sanctuary as Sentinel Site

CLIM4 – Communicating Climate Change

CLIM3 – Resilient Ecosystems

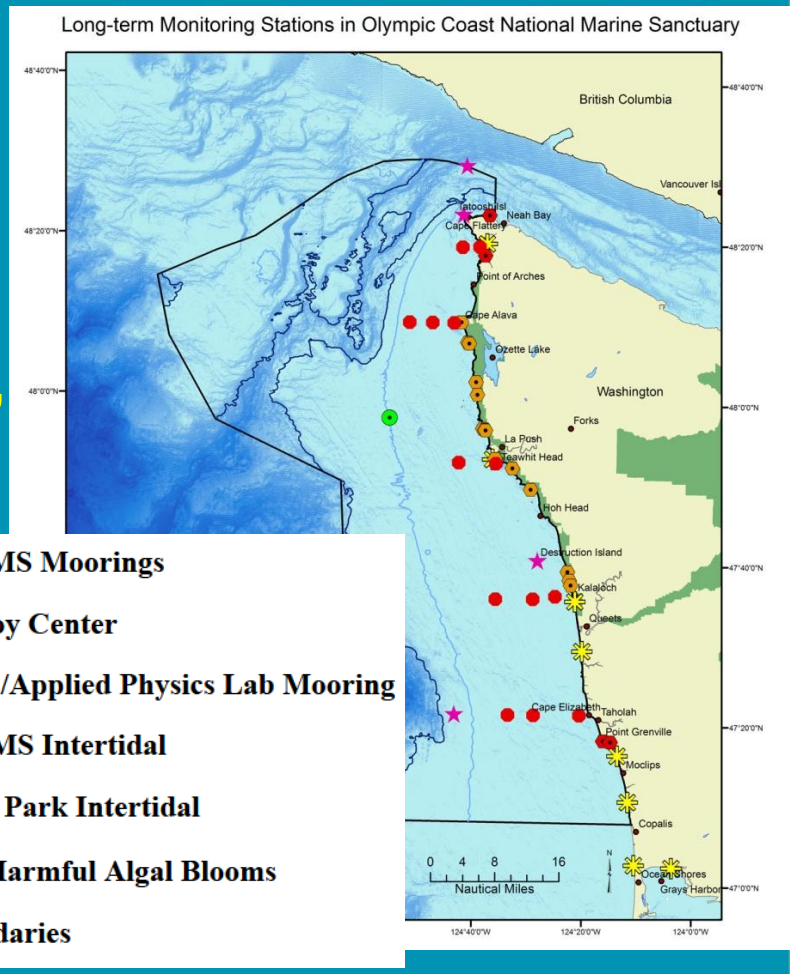
CLIM1 - Climate-smart Sanctuary Program

Active Research/Monitoring in OCNMS

- Algorithm development with PMEL/UW to use data from our nearshore oceanographic moorings for tracking OA (& other stressors) trends
- Staffing – oceanographer Patrick A'Hearn
- Continue partnering with other OA monitoring efforts (PMEL, NDBC, UW/APL Cha Ba mooring, NANOOS, universities, MCI)
- Letter of support for Univ. Chicago NSF proposal (Wootton & Pfister)
- Promotion of OCNMS as sentinel site for monitoring OA, hypoxia, HABs

Olympic Coast NMS as Sentinel Site

- **Issue**: Ocean acidification & hypoxia
- **Activity**: monitoring partnerships
- **Infrastructure**: in situ moorings
  - Sensors include CO_2, OA proxies, currents, wind, temp, O_2, etc.
- **Partners**: NDBC, PMEL, APL, NANOOS, universities, tribes, agencies & NGOs.



DISCUSSION

1. Did the Action Plan meet your expectations, and the intent of the OCNMS SAC OA Resolution?

2. What were some of the priorities for implementations at OCNMS or across the West Coast Region?

3. Have we missed anything?

National Marine Sanctuaries
National Oceanic and Atmospheric Administration

National Marine Sanctuaries

Olympic Coast

http://olympiccoast.noaa.gov